What are Vocal Nodules?
- Nodules are benign growths on the vocal folds, usually related to vocal abuse
- Negative reaction to stress of frequent, hard contact of the vocal folds
- High-risk individuals:
  - Women
  - Children
  - Various stages
- Early – small, soft, pliable tissue
- Chronic – larger, hardened, fibrous tissue
- Diagnosed through evaluation by ENT and SLP
- Stroboscopy

How Nodules Affect the Voice
- Causes different vibratory characteristics of the vocal folds
- Prevents full closure during vibration
- Leads to aperiodicity in the vibratory cycle
- Consequences
  - Raspy, breathy voice
  - Lower pitched voice

Techniques to Reduce and/or Eliminate Nodules
- Voice Therapy
  - Vocal hygiene education
  - Teaching the patient coping strategies
  - Teaching the patient to safely use his/her voice
  - Tension reduction techniques
  - Address breath support (if necessary)
  - Resonant voice therapy
- Surgery
  - Rare cases
- “Generally effective, if completed by the patient with some diligence

Problem
- Patients often do not complete therapy techniques outside of the therapy sessions
- Leads to prolonged treatment periods and poorer treatment outcomes
- Glottal fry has been suggested as a potential treatment method, but there is limited data available regarding its effectiveness

What is glottal fry and how does it work?
- The lowest vocal register
- Vocal folds slowly vibrate, reducing stress on the tissue
- Vocal folds are shortened, relaxing the tissue
- Large movements cause fibrotic tissue of the nodule to vibrate, loosening it
- Vibration of this tissue could lead to a reduction in the size of nodules

Research Question
- Is vocal fry, added to traditional voice therapy, more effective in treating vocal nodules than traditional therapy alone?
- This research explores:
  - The role of glottal fry in conjunction with traditional vocal nodules therapy
  - How glottal fry impacts the reduction and/or elimination of vocal nodules

References
4. Kelsey Dumanch & Hallie Brock; Dr. Abby Hemmerich, PhD, CCC-SLP
5. University of Wisconsin-Eau Claire, Dept. of Communication Sciences and Disorders

Methodology
Participants
- Normative pool created through retrospective clinic chart review
- Individuals who received treatment for nodules using traditional techniques
- Case study S
- College-aged female singer, diagnosed with vocal nodules
- Received traditional voice therapy + glottal fry exercises at home (completed 10x daily for ~2 minutes each time)

Procedures
- Normative group
- Gathered voice recordings and stroboscopy videos from pre- and post-therapy
- Case study S
- Recorded voice and stroboscopy samples pre- and post-therapy
- Gathered patient self-perceptions on Voice Handicap Index and effort rating scale
- All audio and video samples randomized and rated by two licensed SLPs
- Audio samples analyzed for acoustic measures (jitter, shimmer, NHR)

Data Analysis
- Voice samples and stroboscopy videos compared between Case S and normative pool

Major Findings
Can patients complete glottal fry exercises with this frequency?
- S received voice therapy for 6 weeks, throughout which she completed glottal fry exercises
- Average: 7.6/10 times per day

Do glottal fry exercises impact perceptual voice qualities?
- No major differences between normative pool and Case S
- All relatively mild cases

Do glottal fry exercises impact nodule size and vibratory characteristics?
- No major differences between normative pool and Case S
- All relatively mild cases

What were the Case S’s perceptions?
- S received voice therapy for 6 weeks, throughout which she completed glottal fry exercises
- Average: 7.6/10 times per day

Do glottal fry exercises impact acoustic measures of voice?
- Slight improvement in perturbation measures (increase periodicity of vibration)

Conclusions
Is glottal fry effective for treating vocal nodules?
- Maybe?
  - Small changes in some measures (stroboscopy and acoustic)
  - Participant perceptions
    - Often the most important component of therapy, as it is critical that patients “buy-in” to the process and feel as if they are receiving the purported benefits
  - Simplicity of glottal fry (increased compliance from patients)